

**WHITE PAPER  
ON  
CAS EDUCATION STRATEGY**



October 13, 2006

## Introduction

After years of research and discussion, the CAS Board of Directors has endorsed a proposed strategy for future CAS education, with significant implications for both basic education (requirements for membership) and continuing professional development (CPD). Before embarking on implementation, the Board feels that it is critical to gather input from the stakeholders in the CAS education process: members, candidates, employers, educators, regulators and others. This white paper was developed to provide stakeholders with the rationale for the proposed strategy as well as supporting background information. Interested individuals are encouraged to provide feedback on this proposed strategy by **January 31, 2007** in order to enable the CAS Board to continue its deliberations. An online survey form has been developed to facilitate the submission of feedback. The survey will be accessible through a link on the white paper web page of the CAS Web Site.

## Executive Summary

The CAS Board of Directors believes that there are a number of factors that require a new strategy for education of current and prospective CAS members. These factors include:

- The scope of practice of existing members has expanded greatly and is expected to continue to expand in the foreseeable future. We need to support members' expansion into enterprise risk management and other emerging practice areas.
- Many new areas of practice (e.g. generalized linear models, stochastic reserve models, enterprise risk management) are not conducive to testing by timed, closed-book exams.
- Not all skills are needed at the same level of mastery. The introduction of Validation by Educational Experience (VEE) was a first step in recognizing that different mastery levels may be appropriate.
- We need to continue to balance syllabus content creep against travel time.

The CAS Board of Directors believes that the scope of casualty actuarial practice has expanded to the point where it is no longer practical to set a uniform education process for all Fellowship candidates. After consideration of a number of issues and alternatives, the Board of Directors has endorsed the following strategy for future CAS education. This strategy was developed in order to improve the effectiveness of CAS education and is not designed specifically with a goal to reduce travel time.

1. **All candidates for CAS Fellowship would be required to demonstrate rigorous mastery of a core set of capabilities.** Mastery implies a detailed knowledge of the concepts and the ability to apply the concepts to practical problems of reasonable difficulty (i.e. CAS member are recognized experts for these capabilities). The set of mastery capabilities would likely include core analytical and logical reasoning underlying Probability, Interest Theory, Risk Modeling, Applications of Statistics and Credibility, Ratemaking and Classification, and Loss Reserving. However, the set of core mastery capabilities would only be a subset of the current CAS Fellowship requirements. Rigorous mastery would continue to be demonstrated through timed, closed-book exams or some similarly rigorous method.

2. **All candidates for CAS Fellowship would be required to demonstrate familiarity with a second set of capabilities.** Familiarity implies an understanding of the concepts, the ability to apply the concepts to straightforward problems and an ability to acquire additional details if necessary for future practice (but CAS members would not universally be experts on these capabilities). The set of familiarity capabilities would likely include Economics, Corporate Finance, Insurance Policy Forms, Insurance Law and Regulation, Advanced Modeling Skills (e.g. GLM and DFA) and potentially other topics. Familiarity might be demonstrated through means other than timed, closed-book exams, such as university courses, on-line courses and seminars or workshops.
3. **All candidates for CAS Fellowship would be required to demonstrate rigorous mastery of a certain number of elective options.** The set of elective options might include Advanced Ratemaking (including generalized linear models and predictive models), Advanced Loss Reserving (including stochastic reserve models and statutory accounting), Enterprise Risk Management, Reinsurance and Cat Modeling. Rigorous mastery would be demonstrated through timed, closed-book exams and/or workshops with graded projects. The number of electives required to achieve Fellowship would be dependent on the scope and number of electives that are developed (for instance, two out of four electives might be required if the scope of each elective is equivalent to one current exam).
4. **Completion of some or all of the common mastery and familiarity topics might lead to a certificate or a junior membership credential (ACAS or a new credential).** This decision might be influenced in part by whether the set of common mastery and familiarity topics meet the minimum education standards that have been adopted by the International Actuarial Association.
5. **The Fellowship electives should be made available to all Fellows as part of continuing professional development.** This would allow Fellows to cross-train into new specialty areas of practice. CPD certificates could be developed to enhance the value of the FCAS designation. Alternatively, the Fellowship electives could be made available at a less rigorous level without a certificate.
6. **While the use of electives within FCAS education and expansion of CPD to include more rigorous continuing education opportunities is believed to provide benefit to future CAS members, care needs to be exercised to avoid overspecialization.** The FCAS designation has traditionally denoted a generalist knowledge of casualty actuarial practice and the Board feels we should not move too far from that paradigm.
7. **The CAS needs to devote significant effort toward developing improved educational materials to replace the current patchwork of readings.** Such an initiative could have a more significant impact in improving the CAS education process than any other action.

The strategy described in this paper is designed to be a concept statement rather than a detailed proposal for change. There are many unanswered questions that will require discussion before moving forward with implementation. The purpose of this paper is to outline the strategy concept in order to seek stakeholder input to help shape the next phase of discussions. No timeframe has been established for implementation of this strategy.

### **FCAS Education Strategy**

As a result of an apparent increase in travel time during the 1990s, the CAS has conducted a number of reviews of the current CAS education process over the past eight years (see Appendix for a summary of these reviews). While it was subsequently determined that recent travel times do not appear to be materially different from the 1980's, the process reviews that have been conducted have pointed out areas of opportunity for improvements in education. These reviews also raised questions about the fundamental strategy for CAS education.

During this same time, there has been significant expansion in the scope of practice of existing CAS members. This presents an opportunity for the CAS and it is expected that there will be continued expansion in the foreseeable future. However, the need to support new areas of practice, such as enterprise risk management, has led to a need to expand the scope of training of CAS members. But simply expanding the scope of training within the existing education structure will invariably lead to pressure on travel time.

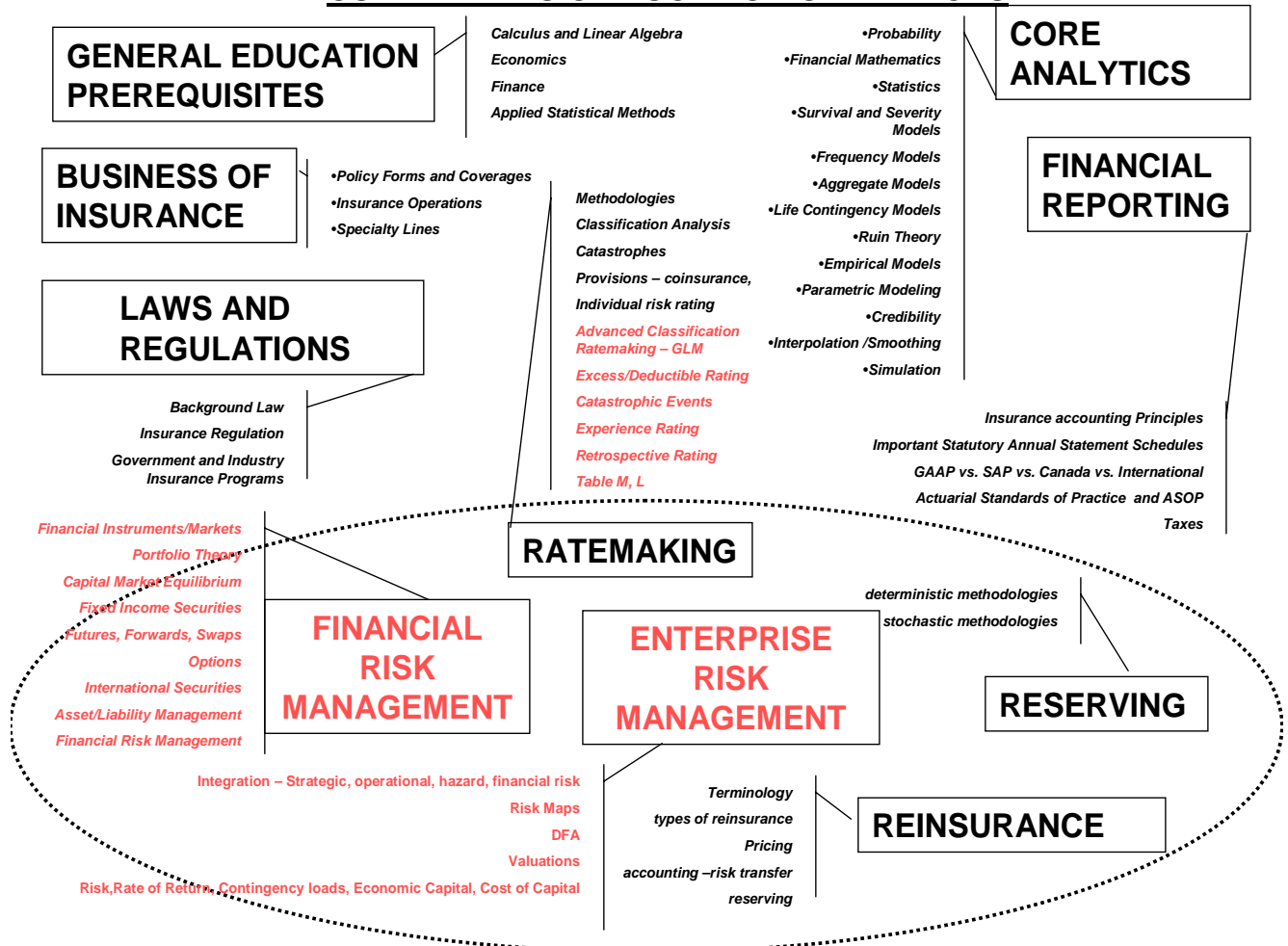
The process reviews that have been conducted have also made clear that many of the new areas of practice require skills that cannot be realistically verified in the traditional setting of timed, closed-book exams. This suggests a need to consider other forms of education and assessment to improve the effectiveness of CAS education.

Another issue raised by the process reviews is whether all skills need to be mastered to the same level of depth. If different skills need to be mastered at different levels of depth, this might also require different forms of education and assessment, such as the Validation by Educational Experience process that was implemented by the CAS and SOA in 2005.

After reviewing the issues raised by the various education process reviews that have been conducted over the past few years, the CAS Board of Directors decided that there were a number of significant policy decisions which needed to be made in order to ensure that the CAS education process would be effective in meeting the needs of current and future members. A Board Task Force was appointed in November 2005 to organize a focused Board discussion of these issues.

The current CAS learning objectives can be summarized as follows:

## CURRENT BASIC EDUCATION OF THE FCAS



**Note- ACAS Education Does not Include the Topics in Red**

The Board Task Force distilled the relevant educational policy issues into a number of specific discussion items for the Board to consider:

- Does the current education process provide actuaries with the right tool kit? (The Board Task Force thought so, with the possible addition of GLMs and regression models for loss reserving.)
- Should new members be equipped only with the toolkit or should they also be prepared to practice? (The Board Task Force suggested that new members should also be prepared to practice.)
- How should we deal with traditional versus developing practice areas? The Board Task suggested the following options:
  - Continue with the current approach. FCAS has the toolkit plus the necessary details to practice as a chief ratemaking actuary in North America AND to sign statutory opinions in the US or Canada. This does not make an FCAS fully

qualified since additional experience or other requirements can be (and are) set by the AAA and CIA.

- Set a different set of common capabilities for all Fellows, possibly less detailed than the current common requirements. Examples include:
  - Keeping all the ratemaking details but drop some of the detail for opinion signers (since more actuaries set rates than sign opinions), pushing those details to continuing professional development (CPD). This would allow a smaller syllabus or room for adding more ERM material. However, the CAS or AAA/CIA would then have to provide some rigorous CPD for opinion signers.
  - Keep the detail necessary for signing opinions (since the legal requirement in the US is CAS membership) but ease off on the jurisdictional detail for ratemaking, leaving that for on the job training and/or CPD. This would allow a smaller syllabus or room for adding more ERM material.
  - Cut back on both ratemaking and reserving detail to allow room for much more ERM material. This might be the future of practice for actuaries, and would probably serve members outside the US and Canada better than today's approach.
- Create a list of applications that only some Fellows should master, and allow options within the FCAS education system. (This is the approach favored by the Board Task Force.)
- How should education be delivered and assessed? Alternatives to traditional intensive exams include in person seminars with no assessment (e.g. Course on Professionalism), verification through means other than CAS exams (e.g. Validation by Educational Experience), easier exams (e.g. transitional VEE exams), intensive seminars with required preparation and a post-seminar project/assessment (e.g. modeling workshop) and structured on-line courses. (The Board Task Force felt that we should use alternate mechanisms where appropriate.)
- If some topics should be offered both pre-FCAS and post-FCAS, should the delivery and assessment mechanism be the same or should a less rigorous approach be available for CPD?
- If the number of traditional closed-book exams is reduced, how many additional requirements (e.g. on-line courses or seminars) would be reasonable to require prior to achieving FCAS?
- What time frame should be used for any transition?

The CAS Board considered these policy issues during a special meeting convened on January 10, 2006. After some general discussion, the Board focused on the capabilities that should be required of all versus only some Fellows and the extent to which those capabilities should require mastery (actuary is an expert) or only familiarity (actuary can understand it but is not expected to be an expert). A list of current and potential capabilities was created and a straw poll of the Board members and other attendees was taken regarding these capabilities. The results of the straw poll are given below:

Capability	All Fellows Master	Some Fellows Master/All Fellows Familiar	All Fellows Familiar	Some Fellows Familiar	Outside scope of Basic Education
Probability	<b>22</b>	1	0	0	0
Interest Theory	<b>23</b>	1	0	0	0
Modeling Risk for Business	<b>12</b>	8	2	1	0
Stats/Credibility Applications	<b>16</b>	4	2	1	0
Rates/Classifications	<b>20</b>	3	0	0	0
Loss Reserving	<b>19</b>	4	0	0	0
Financial Statements	6	<b>17</b>	1	0	0
Enterprise Risk Management	1	<b>18</b>	3	2	0
Financial Risk	6	<b>10</b>	7	1	0
Econ/Finance/Applied Stats (current VEE topics)	5	4	<b>11</b>	1	0
Policy Forms	2	2	<b>19</b>	0	0
Insurance Company Operations	5	7	<b>9</b>	0	0
General Insurance Industry issues	4	4	<b>15</b>	0	0
Insurance Law	1	0	<b>22</b>	1	0
Insurance Regulation	0	5	<b>17</b>	2	0
Financial Reporting	0	<b>15</b>	8	1	0
Professionalism	10	2	<b>12</b>	0	0
Insurance Taxation	0	0	<b>21</b>	3	0
Reinsurance for Risk Management	0	<b>16</b>	8	0	0
Price Monitoring	0	0	<b>23</b>	1	0
Cat Modeling	0	<b>12</b>	11	1	0
Communication Management	0	2	1	1	<b>20</b>
Retrospective/Performance Measurement	0	0	1	0	<b>23</b>
Actuarial Control Cycle	0	4	<b>17</b>	0	0
General Banking	0	0	<b>19</b>	4	1
Bank Credit Analysis/ Technical Analysis	0	0	2	<b>17</b>	5
Risk Management	0	1	2	<b>16</b>	5
Stochastic Reserving	0	0	<b>12</b>	<b>12</b>	0
GLM/Predictive Models	0	0	<b>12</b>	0	0
Asset Management	0	<b>24</b>	0	0	0
Valuation	0	<b>23</b>	1	0	0
	0	<b>12</b>	<b>12</b>	0	0
	0	10	<b>12</b>	0	0

While the straw poll was intended to be illustrative and not definitive, the results of the straw poll suggested that the following strategy could generate an improved education process:

- Mastery by all CAS candidates of a more limited set of capabilities than currently required (e.g. topics 1-6 above). This would likely require timed, closed book examinations or some equally rigorous method.
- Familiarity by all CAS candidates with a separate set of capabilities (e.g. VEE topics, policy forms, insurance law and regulation). These capabilities might be better assessed by means other than traditional timed, closed book examinations.
- Completion of all or most of the common mastery and familiarity capabilities might be appropriate for recognition by a junior level CAS certificate or a junior membership credential (ACAS or a new credential).
- A set of optional mastery capabilities (e.g. advanced ratemaking, advanced reserving/opinions, ERM, reinsurance, cat modeling) could be established as electives. Candidates could be required to achieve the common mastery and familiarity topics plus some number of electives in order to achieve the FCAS designation.
- The electives could also be offered at the continuing professional development level, with a rigorous format including verification. This would allow current Fellows to cross-train into new areas of practice, possibly with CPD certificates to enhance their FCAS credential.
- While some use of electives appears justified based on the capability assessment above, we need to be careful to avoid overspecializing. One of the generally agreed hallmarks of the FCAS designation is the generalist nature of the current education process and we don't want to move too far from the generalist tradition.

The consensus of the CAS Board of Directors was that an education structure as outlined above would better meet the needs of CAS members and candidates than the current structure. This structure would have the following benefits:

- Better flexibility to recognize current and future broadening of casualty actuarial practice without increasing travel time
- Gives candidates better ability to ensure relevance of education to their desired career path
- Provides opportunity to strengthen continuing professional development for current members
- Better recognition that not all capabilities require the same level of mastery
- Better ability to tailor educational delivery to methods that are most appropriate for the topic
- Better relevance of educational system for candidates and members outside the US and Canada

Potential risks for this strategy include:

- Potential marketplace confusion over what FCAS means
- Might need to revise legal requirements for signing statutory opinions

- Even if the number of timed, closed-book exams is reduced, requiring too many total educational requirements might increase travel time
- Another major change to the system could disenfranchise stakeholders

These changes would not necessarily result in reduced travel time, but they would likely make it possible to expand the scope of CAS education without increasing travel time. In order to improve the efficiency of the educational process, it may be more appropriate to focus on developing improved educational materials and improved methods of delivering and assessing education. The CAS Board is committed to pursuing these types of changes as well.

Similarly, these changes could set a foundation for improving continuing professional development but like basic education, CPD also needs to be enhanced through improved delivery of CPD, supplementing the traditional lecture format with participatory workshops, web-based seminars and other techniques. The CAS has already begun to develop these types of enhancements.

On balance, the CAS Board of Directors believes that the benefits of this strategy are likely to outweigh the risks. However, the Board recognizes that a lot more work would need to be done to develop the details of such a strategy and that it would be ideal to gather input on this strategy from key stakeholders (e.g. members, candidates, employers, regulators and others) before proceeding to develop a detailed implementation plan. After reviewing stakeholder input, if the Board feels that the benefits still outweigh the risks, then a detailed implementation plan and proposal will be developed. However, if stakeholder input indicates additional risks or better alternatives, then a revised strategy will be developed.

## APPENDIX

The CAS Board of Directors has been engaged in significant discussions about the effectiveness of CAS education for many years. In 1998, the CAS Board appointed the Task Force on Review of Education and Examination Process and Procedures with a charge to review the processes of the CAS Syllabus and Examination Committees and recommend changes to ensure that the CAS *Syllabus* contains high quality, relevant and understandable readings and that CAS examinations are high quality, credible, relevant and fair. This task force issued a final report in November 1999

(<http://www.casact.org/admissions/reports/tfreep.pdf>). Some of the recommendations of this task force include:

- Develop a measure of syllabus volume to monitor “syllabus creep”.
- Engage specialists to help ensure the relevance of syllabus material
- Many recommendations with respect to improving the quality of exams
- Hiring a staff actuary to assist with admissions activities
- Consider establishing specialty exams rather than requiring all candidates to take the same set of exams
- Consider development of a “para-actuarial” designation (although the task force did not favor doing so)

Based on these recommendations, the CAS Board decided to engage an external education consultant to conduct a further review of CAS syllabus and examination procedures with a specific focus on three issues:

- Development of educationally sound learning objectives and exam blueprints based on the learning objectives rather than the readings.
- Training Examination Committee members on how to write good “thinking” questions.
- Assisting with the construction of measures of exam length and difficulty.

A new task force was formed to develop an RFP and after conducting a search, the task force recommended engagement of The Chauncey Group International to conduct the external review. During late 2000 and early 2001, consultants from the Chauncey Group reviewed CAS admissions procedures against testing industry standards established by Educational Testing Service (ETS) and by the American Educational Research Association, the American Psychological Association and the National Council on Measurement in Education. CAS processes were audited with respect to Customer Service; Fairness; Uses and Protection of Information; Validity; Assessment Development; Reliability; Cut Scores, Scaling and Equating; Assessment Administration; Reporting of Assessment Results; Assessment Use; and Test Takers’ Rights and Responsibilities. The Chauncey audit report was issued in May 2001 (<http://www.casact.org/admissions/reports/2002audit.pdf>). The significant findings from this review included:

- The CAS needs a better process for developing learning objectives, linking syllabus readings to the relevant learning objectives, and setting consistent test blueprints based on the learning objectives.
- The test blueprints should be communicated to candidates rather than being confidential.
- The CAS should develop a training course for question writers to ensure that exam questions will appropriately test comprehension and application.
- The CAS should discontinue use of True-False questions as these do not measure higher levels of comprehension and application.
- The CAS should institute a formal cut score study process for determining pass marks.
- The CAS should consider not publishing exams so that scores and pass marks can be equated from one administration to the next.

Based on the recommendations from Chauncey, the CAS Syllabus Committee conducted a complete rewrite of the *CAS Syllabus*, implementing a learning objective format with syllabus readings linked to learning objectives and with published weights for each learning objective or set of objectives. The CAS Examination Committee developed a question-writing training course that became required for all new committee members. The Examination Committee also instituted a formal cut score study process. The first two of these changes contributed to substantial improvements in CAS admissions processes. The latter has had more limited impact on the upper-level CAS exams given that the process recommended by Chauncey doesn't work as well for essay exams as it does for multiple-choice exams.

However, given concerns about apparent increases in travel time as a result of the 1990's exam partitioning as well as transition impacts from the 2000 exam revisions, in the fall of 2001, the CAS Board created the Future Education Task Force (FETF) with a charge to review the CAS Admissions Process to ensure that it:

- Provides basic education in all areas necessary to the education of casualty actuaries
- Ensures that candidates for admission have demonstrated mastery of critical components of casualty actuarial practice
- Consistent with the above, minimizes the expected amount of time required to achieve membership in the Society

The FETF issued its final report in August 2003

(<http://www.casact.org/admissions/reports/FETFRpt.pdf>). Significant recommendations of the FETF include:

- Two different proposals for restructuring exams, one including Validation by Educational Experience (VEE) and the other excluding VEE
- Eliminating Calculus from Exam 1.
- Restoring the mathematical statistics topics that were eliminated in the year 2000 redesign.
- Moving some introductory P&C material to a new exam that could be taken at the time a candidate begins working in the P&C field.

- Introducing a hands-on modeling workshop to cover DFA-type material that had previously been eliminated due to the inability to cover this material in a paper-and-pencil exam format.
- Considered but rejected the idea of lowering the requirement for the ACAS designation.
- Establishing an “actuarial diploma” as an intermediate step toward achieving ACAS.
- Improving the efficiency of the education process through use of internet-based exams on demand, a study note writing committee, expanded use of semi-open book exams and reducing the number of topics per exam.
- Testing basic and advanced reserving and ratemaking topics together in the context of the “actuarial control cycle” but treating the topics separately at the intermediate level.
- Considered but rejected the idea of optional topics for Fellowship exams.

After discussing the FETF recommendations, the CAS Board of Directors endorsed pursuing computer-based exams, use of means other than CAS-administered exams to demonstrate mastery of some topics, development of a hand-on modeling workshop (as long as this didn’t increase travel time) and finding a way to develop more effective/efficient study materials. This led to the formation of four new task forces:

- The Joint CAS/SOA Task Force on Preliminary Education was formed to develop final recommendations for exams 1-4. New exams were implemented in spring 2005, including use of Validation by Educational Experience as an alternate means to demonstrate competency for some topics.
- The Computer-Based Testing Task Force which led the effort to develop and implement a computer-based testing process for Exam 1 in September 2005. It is expected that additional exams will be converted to a computer-based testing process in the next few years.
- The Task Force on Study Materials which recommended that the CAS pilot a process for commissioning development of a unified syllabus rather than a syllabus composed from piecemeal readings. This effort is currently under way.
- The Task Force on Modeling Workshop which developed and piloted a hands-on modeling workshop at the Spring 2005 CAS meeting for a class of recent new Fellows. Given positive feedback about the workshop, efforts are currently under way to consider how this workshop might be added to admissions requirements and made available as a continuing education offering.

Separate from the various admissions process reviews that have been conducted in recent years by the CAS, the International Actuarial Association has also been looking at educational standards. The IAA felt that the international actuarial profession would benefit from minimum educational standards that could provide guidance to individual member associations that were looking to develop educational programs for their members. The IAA ultimately adopted a set of minimum educational standards and required that all member associations certify that their 2005 education program for full members (i.e. Fellows) met the IAA minimum standards

([http://www.actuaries.org/LIBRARY/Guidelines/Education\\_Guidelines\\_EN.pdf](http://www.actuaries.org/LIBRARY/Guidelines/Education_Guidelines_EN.pdf), [http://www.actuaries.org/LIBRARY/Guidelines/Education\\_Syllabus\\_EN.pdf](http://www.actuaries.org/LIBRARY/Guidelines/Education_Syllabus_EN.pdf)). The CAS was

able to provide such certification since the CAS Fellowship syllabus met the IAA standards (regardless that the ACAS syllabus did not due to IAA requirements that were only covered by CAS exam 8). However, the new IAA requirements created a problem for the American Academy of Actuaries, which has only one class of members (and therefore, could not certify that all of its full members met the IAA requirements). The AAA approached the CAS to discuss options that might enable the AAA to deal with this issue.

The inquiry from the American Academy resulted in discussions that questioned the strategic purpose of the current ACAS designation. The CAS Board created the Task Force on Classes of Membership to investigate the advantages/disadvantages and to develop a recommendation regarding whether there should be one or more classes of membership and the appropriate qualifications, rights and responsibilities associated with these classes of membership. This task force presented a final report in May 2004 (<http://www.casact.org/members/reports/TFClassesOfMembership.pdf>) which recommended that the CAS should have only one class of members with a common set of educational requirements somewhere between the current ACAS and FCAS requirement levels (i.e. 8 exams). After considerable discussion of the task force recommendations, a straw poll of the Board members and attendees at the May 2004 Board meeting showed substantial support for the task force recommendations. However, the CAS Board decided that before pursuing these recommendations further, it would be best to develop a proposed common educational standard that was somewhere between the current ACAS and FCAS requirements.

### **Task Force on FCAS Education**

In September 2004 the CAS Board instructed the Executive Council to establish a task force to develop a proposed set of learning objectives by which FCAS could be attained:

- with less material than the current exams
- with fewer than the current 9 exams
- while meeting the requirements of the IAA
- while being consistent with the Centennial Goal.

The Board's sense was that these goals could be met under a system with eight exams (or possibly seven exams plus a workshop or seminar).

The Task Force on FCAS Education was formed in late 2004 to carry out this charge. The final report of this task force was presented to the CAS Board in November 2005 (<http://www.casact.org/about/reports/TFFCASEd.pdf>). While there was some agreement within the task force about the possibility of developing an educational system with less than the current nine exams, there was considerable disagreement regarding which current topics should be cut and how to deal with developing actuarial practice areas such as ERM. The task force felt that the CAS Board needed to provide better guidance regarding the objectives of the CAS education process before a consensus proposal could be developed. Areas where the task force felt that further guidance was required included:

- What capabilities are basic to CAS membership and what capabilities are associated with specialty areas of practice?
- What capabilities are implied by the Centennial Goal and are these basic or specialty?
- Which capabilities are foundational for accreditation by the AAA or CIA as a casualty actuary practicing in the US or Canada and which exist to advance the worldwide body of knowledge on casualty actuarial practice?
- What balance is appropriate within CAS membership requirements between breadth of study and depth of mastery?
- What balance is appropriate between nation-specific laws and accounting requirements and widely applicable concepts?
- What balance is appropriate between general-purpose skills in mathematics and stochastic processes versus training in methods traditionally used in practice?
- Which capabilities should be gained through basic education (membership requirements) and which capabilities should be gained through continuing professional development?

Although the task force struggled to develop a consensus proposal due to the issues identified above, there were a number of issues on which the task force agreed:

- Learning objectives are a major innovation and the CAS should continue to improve the communication of learning objectives.
- Some educational objectives are better validated through coursework or seminars than by intensive self-study exams.
- Learning objectives should not all require the same level of mastery.
- Nation-specific details should be covered on no more than one exam.
- Continuing professional development needs to be strengthened.
- There have been numerous changes to the education process in recent years and we should be cautious about implementing further changes.

The work of this task force helped the CAS Board of Directors to realize that there were a number of significant policy-level decisions that needed to be made by the Board in order to shape an appropriate strategy for future CAS education.